REMARKS

Claims 1-9 and 11-26 are all the claims pending in the application. By this Amendment, Applicant cancels claim 10.

I. Summary of the Office Action

The Examiner maintains the rejections of claims 1-26 under 35 U.S.C. § 112, first paragraph and 35 U.S.C. § 103(a).

II. Rejection under 35 U.S.C. § 112, first paragraph

Claims 1-12 are rejected under 35 U.S.C. § 112, first paragraph, because allegedly no algorithms or processes are provided for the functions performed by the evaluation and control unit. Therefore, the Examiner alleges that one of ordinary skill in the art would not have been enabled to implement the functions of the evaluation and control unit (see pages 2-3 of the Office Action). Moreover, claims 13-26 are rejected under 35 U.S.C. § 112, first paragraph, because allegedly one of ordinary skill in the art would not have been enabled as to how to perform the functions of comparing picture data and identifying the installation component (see pages 3-4 of the Office Action). Applicant respectfully traverses these rejections in view of the following comments.

A. Introduction

An inventor need not explain every detail since he is speaking to those skilled in the art. What is **conventional knowledge will be read into the disclosure** ... ."It is well settled that the disclosure of an application embraces not only what is expressly set forth in words or drawings, but what would be understood by persons skilled in the art ... [T]he applicant 'may begin at the

point where his invention begins, and describe what he has made that is new and what it replaces of the old. That which is common and well known is as if it were written out in the patent and delineated in the drawings.'" In re Howarth, 210 USPQ 689, 691-92 (CCPA 1981) (quoting In re Chilowsky 108 USPQ 321, 324 (1954) and Webster Loom Co. v. Higgins et al. 105 U.S. 580, 586 (1882)).

Nothing in 35 U.S.C. § 112, first paragraph, or elsewhere, requires the applicant to explain the reasons "**how or why**" a specific element used in the invention works the way it does. "Patentability shall not be negatived by the manner in which the invention was made," 35 U.S.C. § 103, and the Applicant should not be called to task to justify why elements used in their invention work, absent a prima facie showing by the Examiner that the disclosure is non-enabling.

A rejection under the enablement provision of § 112 cannot stand on the grounds presented by the Examiner. In the present case, one of ordinary skill in the art could be someone with a bachelor degree in computer science and/or computer engineering with a few years of experience in the field of computer graphics and visualization. Even in college, the artisan in the above-identified field of art is taught techniques for image recognition and image comparison such as identifying particular objects in the image via comparing with other images or by some other techniques. The Examiner has failed to provide any support for a conclusion that those skilled in the art are unfamiliar with identifying particular objects in the image and would not know how to compare an image with an object of interest from a library or elsewhere.

B. Claims 1-12

Next, turning to the rejection of claims 1-12, the Examiner's position appears to be as follows:

i) In response to Applicant's arguments, the Examiner clarified his position alleging that the "automatic function" is a "critical and integral part of the operation of the evaluation and control unit" and that the "automatic function" is not described with sufficient specificity to provide the necessary enablement. Consequently, the evaluation and control unit is not enabled since it is unclear how an essential component of this unit, *i.e.*, "automatic function" is executed (see pages 2 and 3 of the Office Action).

ii) The processes or algorithms for performing the operations of the evaluation control unit are not described in the specification. Therefore, one of ordinary skill in the art would not have been enabled as to how to implement the operations of the evaluation control unit (see pages 6 and 7 of the Office Action).

Applicant respectfully disagrees with the Examiner. Applicant's position is as follows:

i) Contrary to the allegation of the Examiner, "automatic function" is not an integral and critical part in the operation of the evaluation and control unit. Applicant respectfully submits that the burden is on the Examiner to explain and/or show that the "automatic function" is an essential component of the evaluation and control unit.

Applicant respectfully maintains that the automatic function is a preferable variation of the illustrative embodiment of the present invention. The specification, as originally filed, supports the Applicant's position. In particular, the third paragraph on page 5 of the specification states:

> Since, in one embodiment of the present invention, the evaluation-and-control-unit controls an automatic function, which automatically selects and positions installation components and which adds identified installation components to the virtual installation model, an automatic mode of operation of the device is achieved. Hypotheses are generated and verified by the evaluation-and-control-unit in order to select installation components, to assign installation components to the picture data of the real installation, and to position the assigned installation components in the virtual installation model. Therein, structural information are taken into account, if necessary

(emphasis added). That is, in one embodiment of the present invention, the evaluation and control unit controls an automatic function. However, there is no indication that the automatic function is an essential part of the invention. For example, page 2, first paragraph recites an exemplary formulation of the evaluation and control unit without the presence of the so called "automatic function". Furthermore, see Fig. 10 and pages 16-19 of the specification, where the operation of the evaluation and control unit is discussed without any discussion of the so called "automatic function".

In short, the specification does not teach or suggest the "automatic function" being an essential component of the evaluation and control unit. There is ample support for the operation of the evaluation and control unit without the "automatic function," *see* Figs. 2-10 and at least pages 2 and 16-19 of the specification.

Moreover, the "automatic function" was only cited in a dependent claim 10, further suggesting that the "automatic function" is a preferable variation of one exemplary embodiment of the present invention. To expedite this rather lengthy prosecution of the present application,

Applicant simply cancels claim 10. Applicant does not acquiescence to the Examiner's assertion that one of ordinary skill in the art would not know how to implement the "automatic function." Applicant simply states that the enablement of the "automatic function" is not and cannot be an issue in the present case, since it is not an essential feature but a preferable variation of the present invention and since it is no longer claimed in any of the pending claims.

ii) Contrary to the allegation of the Examiner, one of ordinary skill in the art would have been enabled to implement the evaluation and control unit as set forth in the claims. That is, Applicant maintains the position that the Examiner is imposing an extra-statutory requirement by requiring the application to include the disclosure of specific algorithms or processes for performing the functions of the evaluation and control unit in the specification of the present application.

The present application includes ample disclosure to assist those skilled in the art to implement the functions of the evaluation and control unit in the manner claimed.

To show enablement of the claims function of the evaluation and control unit, Applicant provides the following examples from the specification. Applicant respectfully submits that the passages below are provided by way of an example only and are not intended to limit the scope of the claims in any way. In particular, independent claim 1 recites an evaluation control unit for:

- "*comparing the information data of the installation components with the picture data of the real installation*"

Applicant respectfully submits that page 8, second paragraph of the specification recites that "[t]he evaluation-and-control-unit 5 performs an image analysis, wherein geometric information contained in the digital picture data 4 is identified and matched with geometric information

contained in the component information 13." At page 8, first full paragraph, it is explained that the picture data 4 is the recorded digital picture data of the real installation and the process component data 13 is an object pre-stored in a library. This pre-stored object is compared with the picture data so as to find the pre-stored object in the picture data.

This alone is enough to enable one of ordinary skill in the art to implement the function of comparison identified above since techniques of image recognition and comparison are known in the art.[1] Moreover, "geometric information" could be defined as information related to or determined by geometry.[2] The specification, however, provides a number of possible processes or techniques for the comparison. For example, the specification provides an example of evaluating or comparing edges or combinations of edges, see third paragraph beginning on page 11. Alternatively, or in addition, page 17, first full paragraph lists other geometric properties, which could be obtained from the subclasses "point" 55, "line" 56, and "curve" 57, and last paragraph beginning on page 17 further describes that the comparison is performed based on these geometric elements.

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[1] The identification of objects in an image. This process would probably start with image processing techniques such as noise removal, followed by (low-level) feature extraction to locate lines, regions and possibly areas with certain textures, www.onelook.com.

Some of the many algorithms used in image processing include convolution (on which many others are based), FFT, DCT, thinning (or skeletonisation), edge detection and contrast enhancement. These are usually implemented in software but may also use special purpose hardware for speed, http://foldoc.doc.ic.ac.uk/foldoc/foldoc.cgi?image+processing; *also see* http://en.wikipedia.org/wiki/Image_analysis and Computer vision: basic principles - Proceedings of the IEEE, which discusses various techniques for recognition of geometric property.

[2] http://www.onelook.com/?w=geometric+&ls=a

Clearly then, one of ordinary skill in the art could implement the geometric comparison of the picture data of the real installation with the information data of the installation component. To implement the comparison, one of ordinary skill in the art could have used a conventional technique or some combination of the conventional techniques well known in the art of image recognition and processing. As image analysis processing techniques to recognize or compare geometric properties of an object with geometric properties of an image or portion thereof are known in the art, no further details are necessary.

- *"identifying identified components in the picture data as respective ones of the installation components"*

The components in the picture data are identified via the comparison described above. For example, an exemplary, non-limiting embodiment on page 18, first full paragraph recites that:

> [T]he evaluation-and-control-unit 5 tries - automatically or in interaction with the user - to identify components in the prepared sources 51 (the images 202 or the CAD drawings 203) and to add identified components to the virtual installation model 2. This assignment is based on the geometric elements 53 which were analyzed in the prepared source 51, or on the components 61 via which geometric properties 68 are assigned.

That is, in the exemplary, non-limiting embodiment, if the geometric features and for example, also the structural features of the installation component match a portion or picture data, then the component is identified in the picture data as being the installation component, *e.g.* see Figs 3 and 6. A portion of the picture data is identified as a respective installation component.

- *"deriving hypotheses regarding the identified components in the picture data,"*

Moreover, Applicant maintains that one of ordinary skill in the art is enabled to derive a hypothesis regarding identified components in the picture. By way of an example, the second full paragraph on page 13 of the specification discloses that the structural data 23 are evaluated when the tank is assigned to the digital picture data. That is, each component has structural information such as component type (*e.g.*, a tank) *see e.g.*, the last paragraph beginning on page 16 of the specification and Fig. 10.

The structural data 23 support orientation and positioning of the respective installation component. The structural data is used, for example, to generate hypotheses as to the nature of an additional component and/or the location of an additional component, second full paragraph on page 13 of the specification. For example, the structural information may include data such as "if the component type = tank, then a valve is provided at location x, y, or z." Accordingly, if it is known that the component type = tank, then hypothesis about the location of the valve may be generated and/or derived. Since the component in the picture data is identified, the structural information for the installation component from the library can be used to further position or identify the additional components.

Specific algorithms and processes for deriving the hypotheses are beyond the scope of this invention, as the above-identified process can be implemented in a variety of ways well known in the art. One of ordinary skill in the art would readily recognize how to program the various rules to derive the desired hypothesis. The programming of the various rules to derive the desired hypothesis is nothing more than routine programming within the scope of the

invention. Moreover, the present invention is meant to encompass all possible ways one of ordinary skill in the art would derive the hypothesis for the identified components.

- *"assigning the respective identified ones of the installation components to the virtual installation model"*

Finally, the Examiner has not indicated that this feature is not enabled. For the sake of clarity, and by way of an example, however, Applicant simply refers the Examiner to Figs. 4 and 6 and page 18, first and second full paragraphs, describing adding the identified component to the virtual model. Accordingly, claims 1-9, 11, and 12 are enabled for a person of ordinary skill in the art.

C. Claims 13-26

With respect to claims 13 to 26, the Examiner rejection under 35 U.S.C. § 112, first paragraph appears to be similar to the rejection with respect to claim 1. Namely, the Examiner alleges that one of ordinary skill in the art would not be enabled as to how to compare the components (see page 7 of the Office Action). Therefore, Applicant respectfully submits that arguments provided above with respect to claim 1 apply analogously and with equal force here. Accordingly, claims 13-26 are enabled for a person of ordinary skill in the art.

D. Concluding Remarks with respect to 112, first paragraph rejections

With this disclosure, all that would have been needed to practice the invention claimed is the functionality of the unique evaluation and control unit, as set forth in the claims. It should be evident that, when the functionality is spelled out to the extent done in the present application, translating this functionally to various algorithms or working codes would have been routine, perhaps even trivial, for one skilled in the relevant art. Indeed, software programs can be written

based on the disclosure of the above-identified application, even by persons not skilled in the art, such as a college student majoring in computer science or computer engineering.

By requiring disclosure of such algorithms or processes, *i.e.*, image recognition algorithm (which are clearly outside the scope of the invention), the Examiner is imposing **an extra-statutory requirement**. The "enablement requirement" of 35 U.S.C. § 112, first paragraph, does not require such extensive disclosure, and the Examiner has provided **no factual basis for concluding that such empirical or mathematical algorithms are not information known or available to those skilled in the art**.

"In examining a patent application, the PTO is required to assume that the specification complies with the enablement provision of Section 112 unless it has "acceptable evidence or reasoning" to suggest otherwise. . . . The PTO thus must provide reasons supported by the record as a whole why the specification is not enabling. . . . Then and only then does the burden shift to the applicant to show that one of ordinary skill in the art could have practiced the claimed invention without undue experimentation. . . ." Gould v. Mossinghoff, 229 USPQ 1, 13-14 (D.D.C. 1985) (citations omitted), aff'd in part, vacated in part on other grounds, and remanded sub nom. Gould v. Quigg, 3 USPQ2d 1302 (Fed. Cir. 1987). The test for resolving issues of enablement is well-established: whether one reasonably skilled in the art could make and use the invention from the disclosure in the patent coupled with information known in the art without undue experimentation. See, e.g., Northern Telecom v. Datapoint 15 USPQ2d 1321, 1328-30 (Fed. Cir. 1990); U.S. v. Telectronics 8 USPQ2d 1217, 1222-24 (Fed. Cir. 1988). **A patent document is not intended to be a production specification**. Id.

The Examiner's § 112 rejection amounts to a requirement for a production specification. As noted above, the disclosure does specify the algorithms to be used in implementing each of the functionality at issue. The fact that this disclosure does not expressly set out one or more specific formulae or algorithms is a patent drafting decision, not grounds for an enablement rejection, **unless** the Examiner has **specific factual evidence supporting the contention that those skilled in the art would not be able to make and use the invention without additional disclosure**. The Examiner has not presented any such factual evidence, however.

Applicants fail to understand how the algorithms for image recognition and analysis, in a situation where input and the desired output are spelled out in detail in the specification, can give rise to "undue experimentation." Indeed, even without the specific disclosure referenced above, relevant caselaw, such as the cases noted above, strongly indicates that the experimentation required to generate the software code or to pick a desired image analysis or recognition algorithm would still not be "undue".

In summary, one of ordinary skill in the art, given the application's disclosure, and knowledge generally available, could generate the virtual installation model without undue experimentation. Indeed, the Examiner has not provided any reason or evidentiary support for concluding the contrary. Applicant respectfully submits that a reasonable amount of guidance was provided and no more is required. Therefore, it is appropriate and necessary for the Examiner to withdraw this rejection of claims 1-26.

III. Prior Art Rejections

Turning to the prior art rejections, claims 1-26 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,025,847 to Marks (hereinafter "Marks") in view of U.S. Patent No. 5,640,468 to Hsu (hereinafter "Hsu") and further in view of U.S. Patent No. 5,552,984 to Crandall et al. (hereinafter "Crandall"). Applicant respectfully traverses this rejection in view of the following comments.

First, the Examiner's motivation for combining the three references is not understood and further clarification is respectfully requested. The Examiner maintains that one of ordinary skill in the art would have been motivated to combine the references because creating a 3D model of physical objects provides more efficient detection of discrepancies between the model and the actual image, as described in the prior art of Marks (see page 9 of the Office Action). It is unclear to the Applicant, however, how creating a 3D image, as disclosed in the primary reference, Marks, would motivate one of ordinary skill in the art to include the teachings of Hsu for identifying an object and the teachings of Crandall for creating a virtual system from the virtual components. Moreover, Applicant respectfully submits that one of ordinary skill in the art would not have turned to Crandall when faced with the problem of simplifying the creation of the 3-D modeling system with visual feedback as taught by Marks.

Furthermore, even if Marks, Hsu, and Crandall are somehow combined, the combined teachings do not teach or suggest the unique features of claim 1. Claim 1, among a number of unique features, recites: "an evaluation-and-control-unit for comparing the information data of the installation components with the picture data of the real installation." The Examiner acknowledges that Marks does not teach or suggest at least this unique feature of claim 1.

The Examiner, however, alleges that Hsu teaches a system for comparing component information with real picture data, as set forth in claim 1. The Examiner further alleges that Applicant engages in piecemeal analysis (see page 5 of the Office Action). Applicant has carefully studied the combined teachings of Marks, Hsu, and Crandall, and Applicant respectfully submits that the combined teachings of these references fail to teach or suggest comparing data of the installation components with picture data of the real installation. This unique feature is absent from all three references taken alone or in any conceivable combination.

The Object Extraction procedure identified in Hsu, i.e., at column 13, line 15 through column 14, line 55, does not teach or suggest these recited features. Specifically, in Hsu, the individual objects are generated by one or more of a number of methods, e.g., Binary Image Generation (col. 14, lines 14-19), Connected Components Identification (col. 14, lines 20-24), etc. That is, in Hsu, information data relative to the objects is not compared to the picture data of the actual installation, as disclosed and claimed. To the contrary, in Hsu, the original image is processed, first by segmenting certain features, and then objects representative of those features are generated based on an apparent novel approach of using "a single color (also known as 'single band') or a single-feature-based image." (Col. 13, lines 23-26). In other words, in Hsu, the objects are extracted after the image is segmented. In Hsu, however, there is no teaching or suggestion of comparing the object with picture data of the real installation component. In short, Hsu does not teach or suggest at least this unique feature of claim 1.

Crandall fails to teach or suggest the evaluation and control unit or its attendant features discussed above. Specifically, Crandall is directed to a diagnostic system that incorporates

interconnected virtual components that parallel components of a real system. (Col. 1, lines 6-9). Crandall et al. does not, however, compensate for the deficiencies discussed above with respect to Hsu. That is, Crandall et al. does not teach or suggest an evaluation and control unit that compares information data of the installation components with the picture data of the real installation. Instead, Crandall teaches that a plurality of virtual components form a virtual model. In Crandall, however, there is no teaching or suggestion that installation components are compared with the picture data of the real installation. Crandall et al. does not anywhere disclose a device that compares information data of the virtual components to picture data of a real system to identify components in the picture data of the real system as respective virtual components.

Therefore, "an evaluation-and-control-unit for comparing the information data of the installation components with the picture data of the real installation," as set forth in claim 1 is not suggested or taught by the combined teachings of Marks, Hsu, and Crandall, which lack comparing installation components to a picture data of the real installation system. Together, the combined teachings of these references, taken alone or in any conceivable combination, does not teach or suggest above-identified features of claim 1. For at least these exemplary reasons, the proposed combination of Marks, Hsu and Crandall et al. fails to render obvious independent claim 1. Therefore, Applicant respectfully requests the Examiner to reconsider and withdraw this rejection. Claims 2-9, 11, and 12 are patentable at least by virtue of their dependency on claim 1. Claim 10 has been canceled.

In addition, dependent claim 4 recites: "a display device to display three views, wherein a first view of the three views displays the real installation based on the picture data; wherein a second view of the three views displays the information data of the installation components of the component library; and wherein a third view of the three views displays the virtual installation model." The Examiner alleges that Hsu teaches image analysis and Marks teaches locating objects (see page 10 of the Office Action). This, however, has nothing to do with the display device and the display views, as set forth in claim 4. It is Applicant's position that the combined teachings of Marks, Hsu, and Crandall, fail to teach or suggest the unique features of claim 4. For at least this additional reason, dependent claim 4 is patentable over the combined teachings of these references.

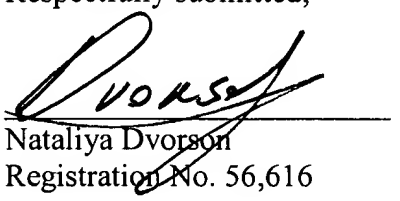
Furthermore, for analogous reasons as those discussed above in regard to claim 1, the proposed combination of references fails to teach or suggest at least step (b), i.e., the comparing step, of independent claim 13 and the processing unit of independent claim 25. Claims 14-24 and 26 are patentable at least by virtue of their dependency on claims 13 and 25, respectively.

IV. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly invited to contact the undersigned attorney at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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